Appendix B

UNITED STATES
DEPARTMENT OF
AGRICULTURE

Evaluation of Forest Tent Caterpillar and Fall Cankerworm on Seneca Nation of Indian Lands in 1994

Forest Service

Biological Evaluation

Northeastern Area

December 1994

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INTRODUCTION

The forest land of the Seneca Nation of Indian serve many uses, including timber production, recreation, and wildlife habitat. Over the last 2 or 3 years the forests on the Allegheny Reservation have been subject to biotic stress caused by a complex of defoliating insects, including forest tent caterpillar, fall cankerworm, gypsy moth, and elm spanworm. The majority of this reservation is in hardwoods, either oak or mixed hardwood type, both of which are susceptible to most of these insects.

In May of 1994 a suppression project was carried out to protect forest land from gypsy moth and elm spanworm on about 3000 acres of the Allegheny Reservation. An aerial survey later in the summer indicated there were still areas that had moderate to heavy defoliation.

To determine the potential for defoliation caused by forest tent caterpillar and fall cankerworm in 1995, surveys were conducted on November 28-December 1.

METHODS

Forest tent caterpillar was surveyed using two techniques. In the first, branch samples were pole pruned from the mid-crown and the number of egg masses were counted. The cut branches were approximately 30 inches in length and 10 branches constituted one sample unit following the procedure in Connola et al. 1957. The second method was examining the entire crown for egg masses using binoculars to look at all branches, even in the top of the crown. This method is reviewed in Hodson 1941. Egg mass counts can then be used to predict defoliation in the coming year.

Fall cankerworm was sampled using sticky bands to trap adult females. In five areas, 9 or 10 trees were selected and had a 4 inch band of tangletrap applied to the trunk in late September. Female moths, which are wingless, emerge after this time and climb the trunk of the tree to lay eggs, and will get caught in the sticky band. The number of adult females caught can then be used to predict defoliation in the coming year. These defoliation estimates are based on the work of Kegg 1967.

Survey areas for both insects were chosen based on past defoliation history. Most of the areas experienced moderate to heavy defoliation this past year. Other areas had been defoliated two years ago. Overall, a variety of forest types were surveyed, from predominantly oak to mixed hardwood types.

RESULTS

The number of forest tent caterpillar egg masses found and the predicted defoliation are shown in tables 1 and 2. Table 1 has the results from pole pruning and table 2 has the results from examining whole trees. Table 3 lists the results from the fall cankerworm banding. The number associated with each site in the tables corresponds to areas on the included maps.

Table 1. Number of forest tent caterpillar egg masses and predicted defoliation as determined by pole pruning.

Area	# of samples	# of egg masses	Predicted defoliation
1-Stateline-1	4	2	Light
2-Stateline-2	5	1	Light
3-Windfall Creek	3	29	Moderate-Heavy
4-South Carrollton	4	26	Moderate-Heavy
5-Pennzoil Lease	5	18	Moderate-Heavy

Table 2. Number of forest tent caterpillar egg masses and predicted defoliation as determined by whole tree examinations.

Area	# of samples	# of egg masses	Predicted defoliation
1-Stateline-1	4	1	>10%
2-Stateline-2	6	8	>10%
3-Windfall Creek	6	21	10-20%
4-South Carrollton	10	90	35-50%
5-Pennzoil Lease	8	88	50%
6-Shongo	11	145	55-60%

Table 3. Number of fall cankerworm adult females caught and predicted defoliation.

Area	# of trees banded	# of adult females	Predicted defoliation
1-Stateline-1	9	0	>10%
2-Stateline-2	9	1	>10%
3-Shongo	10	102	60%
4-South Carrollton	10	97	60%
5-Pennzoil Lease	10	61	35%

DISCUSSION

It is our estimation that there are areas that will have high levels of defoliation on the Allegheny Reservation in 1995. The population estimates for forest tent caterpillar in the Shongo, South Carrollton, Pennzoil Lease and Windfall Creek areas are all fairly high. Both of the methods used to get these estimates were fairly new and untested by us until this year. Our guess is that these estimates are more likely low than high, which means that the defoliation could be even greater than expected. This is compounded by the fact that in areas with moderate to high forest tent caterpillar, the stands already have very low basal areas. Because these stands are not fully stocked there is less possible foliage so a smaller number of insects is required to cause defoliation. Also, in three of the four areas there is a sizable population of fall cankerworm (it is fair to assume that in the final area, Windfall Creek that similar numbers of fall cankerworm exist), which could also cause moderate defoliation. This combination of multiple pests in already thin stands leads us to the conclusion that these areas could experience heavy defoliation this coming year.

ALTERNATIVES

1. Aerial suppression of forest tent caterpillar in the areas of Shongo, South Carrollton, Pennzoil Lease, and Windfall Creek. This covers an area of about 2800 acres.

2. Let the infestation run its course and decline naturally. This could mean defoliation and possible loss of growth, vigor, and mortality in the coming year.

We support alternative number 1. The areas that show signs of having high insect population next year were moderate to heavily defoliated in 1994, and some were also defoliated in 1993. It is possible that there could be tree mortality if these stands are not protected against further stress in 1995.

LITERATURE

Connola, D.P., W.E. Waters, W.E. Smith. 1957. The Development and Application of a Sequential Sampling Plan for Forest Tent Caterpillar in New York. New York State Museum and Science Service, Bulletin # 366.

Hodson, A.C. 1941. An Ecological Study of the Forest Tent Caterpillar, *Malacosoma disstria* Hbn., in Northern Minnesota. University of Minnesota Agricultural Experiment Station, Technical Bulletin # 148.

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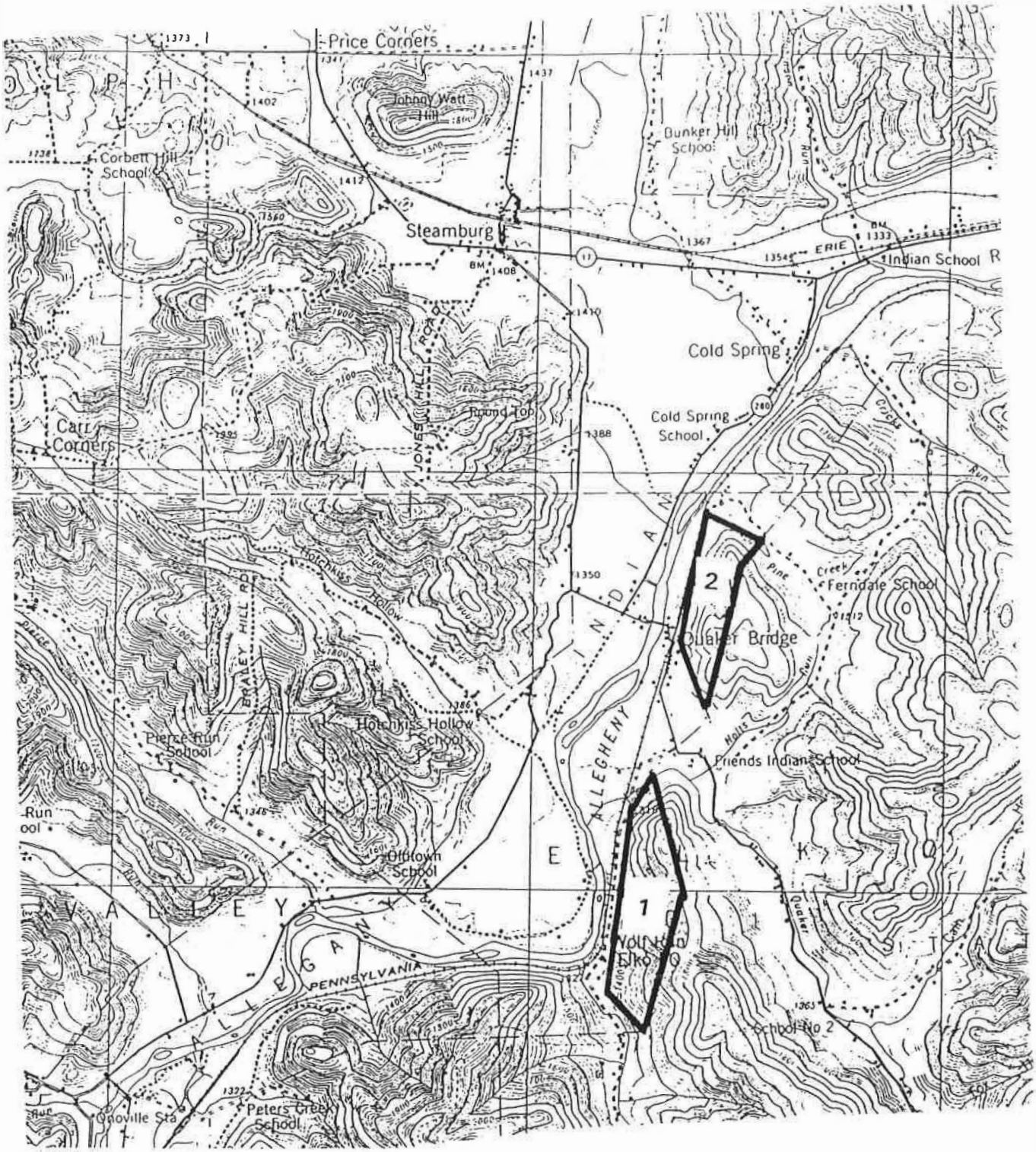

Biological evaluation areas for forest tent caterpillar and fall cankerworm on the Allegheny Reservation, Seneca Nation of Indians.

SUMMARY OF INSECTICIDES

PROPERTIES OF DIFLUBENZURON AND BACILLUS THURINGIENSIS

In this section, the mode of action, fate in the environment, and toxicology to forest organisms are briefly summarized for the biological insecticide *Bacillus thuringiensis* (B.t.) and the chemical insecticide diflubenzuron. The information on these materials was taken from: 1) the USDA Final Environmental Impact Statement, as supplemented in 1985 and amended in 1986; 2) the USDA, Forest Service, Southern Region, Environmental Impact Statement, Appalachian Integrated Pest Management (AIPM), Gypsy Moth Demonstration Project; and 3) other sources listed in the references.

a. Bacillus thuringiensis

Mode of Action for Bacillus thuringiensis - This living microbe kills by paralyzing its host's gut, then growing to consume its body cavity. It only becomes active in species with alkaline guts. Death occurs 7 to 10 days after ingestion.

Fate in the Environment - B.t. can survive in soil for several weeks but sprayed B.t. only retains its effectiveness on leaves 4-10 days, depending upon how much rain falls within a few hours after it is sprayed.

Toxicology - No adverse effects of B.t. have been reported to quail, rats, dogs, mice, pheasants, hens, rainbow trout, bluegills, or humans; however, it will kill most caterpillars of moths and butterflies in the spray area if they eat it. Insects, like the honeybee, which do not have alkaline guts, are not affected.

B.t. proposed for this project also possesses little risk to humans. The project will not be using the other strains of B.t. which have caused infection from a contaminated needle and by splashing B.t. into the eye.

Recent concern over B.t. containing disease-causing organisms has been examined. There is no hazard to humans associated with its use as proposed.

b. Diflubenzuron

Mode of Action - Diflubenzuron regulates the growth of insects by interfering with their production of a new body wall during the molting process, such that the insect dies.

Fate in the Environment - Diflubenzuron dissipates rapidly in all substrates it encounters, primarily through microbial degradation, even when applied experimentally at from two to four times the registered rates allowed for gypsy moth suppression. At this higher rate, it remains detectable on leaf surfaces longest, up to two months in deciduous forests, whereas in hardwood forest soil and litter it can be found for up to two weeks. It does not leach through the soil, and in water, it can be detected for varying periods of from 1 to 20 days depending upon how much is washed off the foliage immediately after spraying. This chemical does not accumulate in animals which have eaten those caterpillars receiving a lethal dose. When applied at the registered rate of 0.5 ounce active ingredient per acre, it is even less detectable in these substrates.

Toxicology - Diflubenzuron is less toxic to mammals than table salt, aspirin, caffeine, and nicotine. Birds are not affected directly and their loss of food has minimal or short-term impact. As for

invertebrates, sensitive species include some aquatic micro-invertebrates and terrestrial arthropods with a life cycle and feeding habits similar to that of the gypsy moth.

When exposed to registered dosages, aquatic invertebrate populations recovered within three months or less due to recolonization through drift within streams. Even in headwater streams, community structure for invertebrates, such as mayflies and stoneflies, were not affected when acute dosages were present in rapid wash-off of diflubenzuron applied at the registered rate (Jones and Kochenderfer, 1987). This is indicative of the lack of toxic effects from short exposures to even high concentrations of diflubenzuron given that these two aquatic insect groups have been reported as sensitive to higher than registered rates in long-term chronic studies (Hanson and Garton, 1982, and Swift et al, 1987).

Overall effects are limited, due to the short-lived persistance of the chemical and recovery of affected populations (through migration and reproduction) within 14 to 28 days in most cases (Wilcox and Coffey, 1978).

Effectiveness of Diflubenzuron and Bacillus thuringiensis

The effectiveness of each insecticide under consideration depends on the dosage that each larva receives in relation to its size. Treatment results are presented from recent suppression projects to reduce gypsy moth populations and their defoliation.

Larval Size and Dosage - Diflubenzuron at the same small dosage is lethal to gypsy moth larvae of any size. This material does not kill immediately but acts only at the time an insect molts to grow into a larger larva or when it transforms to a pupa or adult. Diflubenzuron's primary means of entry is by ingestion, although larvae can absorb a lethal dose through the body. Recent investigations to take advantage of this absorption entry mode have been made with an early-timed application of diflubenzuron to reach first instar (feeding form of the insect between molts) gypsy moth larvae at the time of general egg hatch but before they disperse to host vegetation to feed. Control has been just as effective at reducing populations and preventing defoliation as it has been during the standard timing which calls for treatment after larvae have settled on host foliage, fed and enlarged to a second instar (Schneeberger, personal communication, 1988).

B.t., on the other hand, must always be ingested, but because of its mode of action, larval size greatly influences the effectiveness of a constant dosage. A small dose of B.t. is much more effective against smaller, younger larvae (first to third instars) than against larger, older larvae (fourth instar and beyond). Therefore, the treatment "window", or the time period when a small dose of spray material achieves its effectiveness, is more restricted with B.t. than with diflubenzuron.

Treatment Effects to Reduce Populations - Given optimal application conditions, diflubenzuron generally will kill all the larvae it contacts within a sprayed area. The key factor is getting it to the larvae as soon as possible after egg hatch. During a 1988 early-timed diflubenzuron evaluation at the time of general egg hatch in Delaware, larval reduction averaged 97 percent in four spray blocks where prespray egg mass densities averaged 1,599 per acre (Schneeberger, personal communication, 1988). However, failures with diflubenzuron do occur. In this same Delaware evaluation, three blocks failed to give more than 51 percent egg mass reduction. These failures have been due to warm, windy conditions during application.

The average mortality rate with a single treatment of B.t. under optimal conditions does not generally exceed 85 percent and this almost always occurs when gypsy moth populations are in decline during the last year of their outbreak phase (refer to Section III. D. for a discussion of gypsy moth population cycles). Success at reducing populations undergoing their first year of the outbreak phase is often much less. In 1987 single treatments with B.t. were erratic and effective in only half the spray blocks. Defoliation and tree mortality resulted in these spray blocks.

Both B.t. and diflubenzuron have been used in gypsy moth treatment programs conducted on the Allegheny National Forest since 1985.

HISTORY OF SPRAY TREATMENT ON THE ALLEGHENY NATIONAL FOREST (ACRES)

Pesticide	*1985*	*1986*	*1987*	*1988*	*1989*	*1992*
Diflubenzuron	9,000				14,600	
B.t.	1,500		29,500	6,100	15,300	3,876
Second B.t.				1,800	12,300	19,486

Data collected on a limited number of spray blocks (shown in parentheses) for the ANF suppression projects during 1987, 1988, 1989, and 1992 shows B.t. and diflubenzuron treatment effectiveness in terms of average percent egg mass reduction for both single and double applications of B.t.

GYSPY MOTH POPULATION REDUCTION IN 1987-1992 ANF SPRAY BLOCKS

Pesticide	*'87 - Increasing*	*'88 - Declining*	*'89 - Declining*	*'92 - Increasing*
Single B.t. Application	44% (84)	73% (18)	95% (12)	96% (16)
Double B.t. Application	-- (0)	92% (10)	98% (45)	97% (40)
Diflubenzuron	N/A	N/A	99.5% (29)	N/A

B.t. has proven to be less effective at preventing defoliation during building and outbreak phases compared to the declining phase of the population cycle. As a case in point, the treatment results with B.t. in 1987, when populations were building, were erratic and effective in only half the spray blocks that had average egg mass densities exceeding 1,000 per acre. In 1988 and 1989 when populations were declining, desired treatment results were achieved in nearly all the spray blocks. In 1992, when the populations were on the increase, desired treatment results were achieved in all but one spray block.

Other recent findings with replicated and controlled field experiments, however, have shown that single and double applications of B.t. are not usually significantly different from each other (Dubois et al, 1988). Double applications have been occasionally used in large operational spray projects such as that being considered in this EA. Since the ANF has found two treatments to be effective in the past, we will again use double treatments and compare the effectiveness against single treatment.

The most comparative data available for assessing treatment success of diflubenzuron and B.t. comes from the USDA, Forest Service, NA-FHP, Spray Monitoring Data Base maintained in Morgantown, WV. The following tabulation from Maryland, Delaware, Virginia, West Virginia, and the Allegheny National Forest from 1986 to 1988 indicates spraying success based on number of spray blocks where the residual egg mass densities after spraying were reduced to 500 or less per acre, or were reduced by 80 percent or more.

AVERAGE POPULATION REDUCTION OVER A THREE-YEAR PERIOD (1986-1988)

Suppression Project	*Diflubenzuron*	*B.t.*
Delaware	76%	73%
Maryland	83%	46%
Virginia	82%	—
West Virginia	92%	—
Allegheny National Forest	—	82%
Average	83%	67%

Treatment Effects to Reduce Defoliation - When these spray materials are applied at the proper time and dosage, their optimum effectiveness result in defoliation usually being less than 10 to 15 percent with diflubenzuron, and less than 20 to 30 percent with B.t. (Acciavatti, personal communication). The probability that less than optimum results will occur is higher for B.t. than for diflubenzuron due to B.t.'s mode of action and its narrower treatment window.

VIRGINIA COOPERATIVE EXTENSION SERVICE
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GYPSY MOTH SPRAY MATERIAL FACT SHEET

There are two insecticides that can be used for control of Gypsy Moth. They are Diflubenzuron and Baccillus Thuringienses. An explanation of these two insecticides are presented below.

DIFLUBENZURON

What is Diflubenzuron and how does it Work?

Diflubenzuron is an insect growth regulator sold under the trade name of Dimilin(R). Immature insects, such as gypsy moth caterpillars, grow by shedding their outer skin (exoskeleton) and forming new larger skins. An important structural component of the outer skin of most insects is chitin. Dimilin(R) inhibits chitin production in immature insects. The caterpillar is unable to form its new outer skin and death results within a few days after the application of Dimilin(R). Dimilin(R) can effect other chitin-producing organisms including water flea, shrimp and bluecrabs. Therefore the use of Dimilin(R) is not allowed over open bodies of water in order to prevent damage to non-target organisms.

What Are Dimilin's(R) Uses?

The Environmental Protection Agency (EPA) has registered the use of Dimilin(R) for the control of gypsy moth caterpillars in forested residential, commercial and municipal areas. Dimilin(R) can be used to control the: forest tent caterpillar, Nantucket pine tip moth, and Douglas fir tussock moth in forest and recreation areas; boll weevil on cotton; several foliage insects on soybeans; scarid flies on commercial mushrooms; and mosquito larvae in pastures.

What Are The Environmental Effects?

When used at the labeled rates (1-4 ounces per acre), Dimilin(R) has a very short residual life in the environment. Its "half-life" which is the time required for half of the substance to be broken down, is less than a week in water, 3-15 days in soil, and is variable on foliage. Ground water contamination; stream contamination resulting from run off; and translocation in plants in unlikely since Dimilin(R) rapidly binds to soil particles. Once in contact with soil, Dimilin(R) is degraded by soil microorganisms causing no harm to soil microbes, fungi, mites, springtails or earthworms. Dimilin(R) does not bioaccumulate in the food chain.

What are the effects on Vegetable Gardens?

There is no need to cover your home garden unless you desire to do so. The EPA has registered Dimilin(R) for aerial application in urban forested communities. During the review process, EPA took into consideration that home gardens would be located in areas where aerial application of Dimilin(R) would occur. EPA found no reasons to include a precaution statement on the label for home vegetable gardens since Dimilin(R) has a very low mammalian toxicity when ingested. In addition, Dimilin(R) is broken down quickly by soil microbes and does not translocate or absorb into plant tissue. It can easily be washed off with soapy water.

What is "Toxicity"?

Toxicity is the potential for a substance to cause harm to organisms with which it interacts. There are two measures of toxicity, short term (acute) and long term (chronic).

Acute Toxicity

Acute or short term toxicity levels, as presented in the following chart, include the amount of material needed to kill one half of the experimental animals when administered in a single dose.

Comparative Acute Toxicity Levels (Short Term)

Materials	Acute Oral LD_{50}*	Level
Caffeine	192 mg/kg	Highest Toxicity
Sevin(R)	500-850 mg/kg	
Orthene(R)	866-945 mg/kg	
Aspirin	1600 mg/kg	
Table Salt	3000 mg/kg	
Vinegar	3310 mg/kg	
Methoxychlor(R)	6000 mg/kg	
Dimilin(R)	40,000 mg/kg	Lowest Toxicity

*These numbers represent the amount of material fed to the test animal population in a day which resulted in death of half the test population. It is generally expressed as milligrams per kilogram body weight.

What Are the Health Effects for Humans and Other organisms?

- Dimilin(R) had no growth or reproductive effect on test animals.
- Dimilin(R) does not cause cancer. It was concluded that Dimilin(R) used at the recommended rate posed no health threat to human populations in or near sprayed areas. There has been concern that a metabolic breakdown product of Dimilin(R), 4-chloroaniline, will cause cancer. The USDA found the risk levels for 4-chloroaniline to be 100 to 1,000 times below the one in a million ($1x10^{-6}$) cancer risk associated with smoking two cigarettes in a lifetime or eating six pounds of peanut butter in a lifetime.
- Dimilin(R) has low mammalian toxicity through oral, dermal and inhalation routes.
- Dimilin(R) does not bioaccumulate in wild animals.
- Dimilin(R) has low toxicity to birds (e.g. bobwhite quail and mallards).
- Dimilin(R) has high toxicity to certain aquatic invertebrates if sprayed directly over a body of water (e.g., water flea (Daphnia), shrimp (Eulinmada)). If Dimilin is sprayed directly over water it may cause a temporary reduction of these aquatic invertebrate populations and may cause reproductive damage to blue crabs. Dimilin(R) is therefore restricted from use over open bodies of water.
- Dimilin(R) has no effect on adult beneficial parasites.
- Dimilin(R) has no effect on honeybees.

Chronic Toxicity

Chronic toxicity is a measure of damage caused in test animals due to the administration of repeated small doses over an extended period of time. No irreversible long term effects were determined to exist in studies conducted with Dimilin(R).

BACILLUS THURINGIENSIS

How Does Bacillus thuringiensis Work?

Bacillus thuringiensis (Bt) is an insect disease causing bacterium which can only be found in the soil or in infected caterpillars. It is commercially produced in laboratories for use as an insecticide. It can be purchased by homeowners and is sold under the trade names of Dipel(R), Thuricide(R), Worm Killer(R) and Foray(R). During the commercial production of Bt, spores (resting reproductive structures) and crystals (Delta-endotoxins) are produced. Bt must be eaten by the caterpillars to be effective. Once ingested, the crystal is dissolved by the enzymatic activity induced by the high gut pH of the caterpillar. This activity releases a toxin from the crystal which interferes with the gut cells and feeding stops within hours. Death of the insect will occur in three to seven days from either the toxin or from the bacterial spore invading the insect's blood system.

What Are Bt's Uses?

The EPA has registered the use of Bt for control of gypsy moth. Bt is also used against the following: fall webworm; spring and fall canker worm; bagworm; spruce budworm; Eastern tent caterpillars; cotton leafworm; loopers; fruit tree leafroller; cut worm; horn worm; cabbage butterfly; armyworm; and apple leaf skeletonizer.

What Are the Environmental Effects of Bt?

Commercially produced Bt, when used at labeled rates, has a very short life in the environment. It can remain active from one to twenty days depending on weather conditions and exposure to ultra violet light. Under normal weather and exposure conditions, formulations of Bt usually remain active from three to seven days after application. Due to the specific conditions required within the insect, Bt only effects leaf feeding caterpillars (lepidopterous larvae) that are actively feeding at the time spray material is on the foliage.

Some concern has been expressed about butterfly caterpillars that are present in early Spring when spraying occurs. Many of these larvae are not as susceptible to Bt as gypsy moth caterpillars, and do not show harmful effects when sprayed. In addition, most butterfly caterpillar feed on plants found in fields or in the understory and are not physically present to come in contact with the insectcide because only tree canopies are sprayed.

Since Bt is so specific in it's mode of action, it can be sprayed over water with no adverse effects on other organisms. It does not bioaccumulate in the food chain. If other animals such as birds or small mammals feed on Bt killed insects, the spore and the crystal pass through their digestive system with no adverse effect. This occurs because the enzymes and high gut pH needed for release of the toxin are not present.

What is the Toxicity of Bt

- Bt has very low mammalian toxicity through oral, dermal and inhalation routes. Tests conducted on guinea pigs, mice, rabbits and humans showed no toxic reactions. Test results from human volunteers eating Bt showed no adverse effects.
- Bt has no adverse effect on wildlife. Tests done in laboratories, field trials and during actual control projects showed no effects on birds, mammals or fish.
- Bt has no effect on earthworms, parasitic wasps, honey bees, praying mantis or other insects except moth and butterfly caterpillars.
- Based on extensive testing conducted on Bt and it's very specific mode of action, the EPA has exempted Bt from tolerance requirements for residues on food crops. Tolerance requirements are the amount of pesticide residue permitted by federal regulations to remain on or in a crop at the time of harvest.
- No long term effects were determined to exist in studies done on Bt.

EFFECTIVENESS OF BOTH MATERIALS

Bt is only about 60-80% effective. Its effectiveness is dependent upon the size of the caterpillars ingesting it, the amount ingested, and the micro-environment of the caterpillar's gut. Therefore, it is used in areas of low gypsy moth populations to prevent defoliation. Dimilin is 90-95% effective, and is used in areas where Bt can no longer effectively protect foliage due to the higher caterpillar densities.

PRECAUTIONARY STATEMENT

Both of these materials are insecticides and should be treated as such. If you feel you have been sprayed by any insecticide, remove and wash clothing, take a shower with soap and water, and wash hair. When rinsing, use lots of clean water. If materials get in your eyes, rinse eyes with clean water for fifteen minutes. If irritations persist, call your doctor or nearest poison control center.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Appendix D

M E M O R A N D U M

TO: SCOTT MENEELY, BUREAU OF INDIAN AFFAIRS

FROM: PETER NYE

DATE 11 JANUARY 1995

SUBJECT: PESTICIDE SPRAYING - ALLEGHENY RESERVOIR 1995

Per your telephone conversation and follow-up fax of today, I am responding to your request regarding federally listed T or E species which may occur on or near the Allegheny Indian Reservation. I understand you are proposing to spray for tent caterpillars during May 1995 using either BT or Dimilin 2.

As I mentioned on the phone, we had a pair of bald eagles attempt to nest on the reservoir in 1994, although they were not successful. Eagles have shown interest in this site for several years, and I therefore expect activity again there next year. I have circled this eagle area on one of your faxed maps (Steamburg quad), and as you will see, it is directly accross from your proposed spray unit 2, and near spray unit 1. Our biggest concern eagle-wise is likely not either substance itself, but rather potential disturbance to nearby nesting eagles. Unfortunately, April and May are the most critical months for nesting eagles. Should we confirm nesting activity near any of your proposed spray units, we would recommend a no-fly buffer zone around the area of concern. You should contact my office prior to actual spraying (April) to determine what nesting activity may have been found.

On a broader scale, I am concerned about the potential negative effects of Dimilin, particularly on crustaceans and lepidopterans.

By copy of this memo, I am asking our regional wildlife biologist, Mr. Tom Jurczak to also look over the proposed spray zones since he is familiar with eagle use on a broader scale along the reservoir.

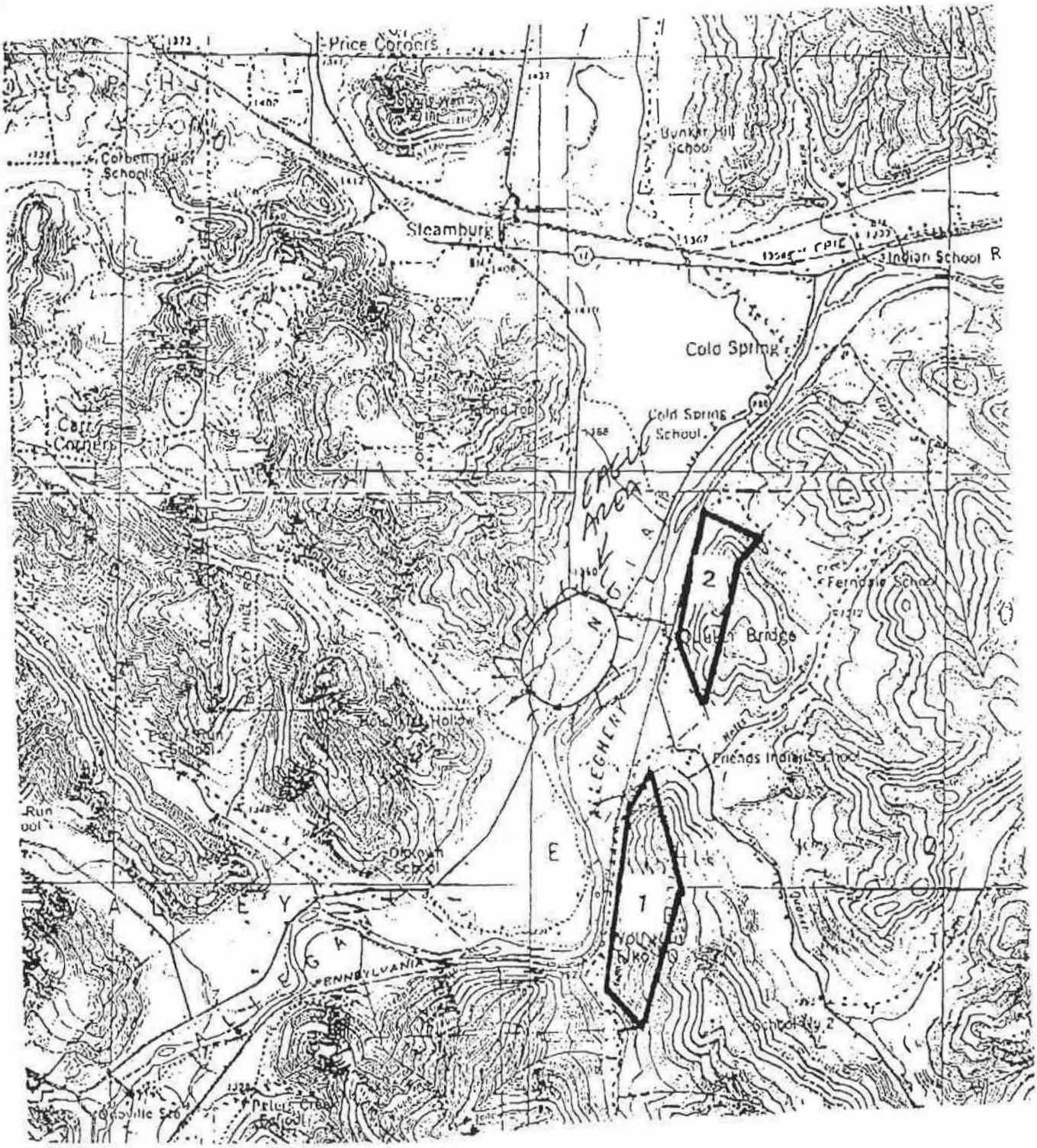
I suggest you also contact our Natural Heritage Unit to request an official review of the sites against our rare species database, if you have not already done so. Contact them at 700 Troy-Schenectady Road, Latham, NY 12110.

Thanks for the opportunity to review this project. If I can be of further assistance please let me know.

Pete

cc Tom Jurczak, Olean DEC
Mark Clough, USFWS, Cortland

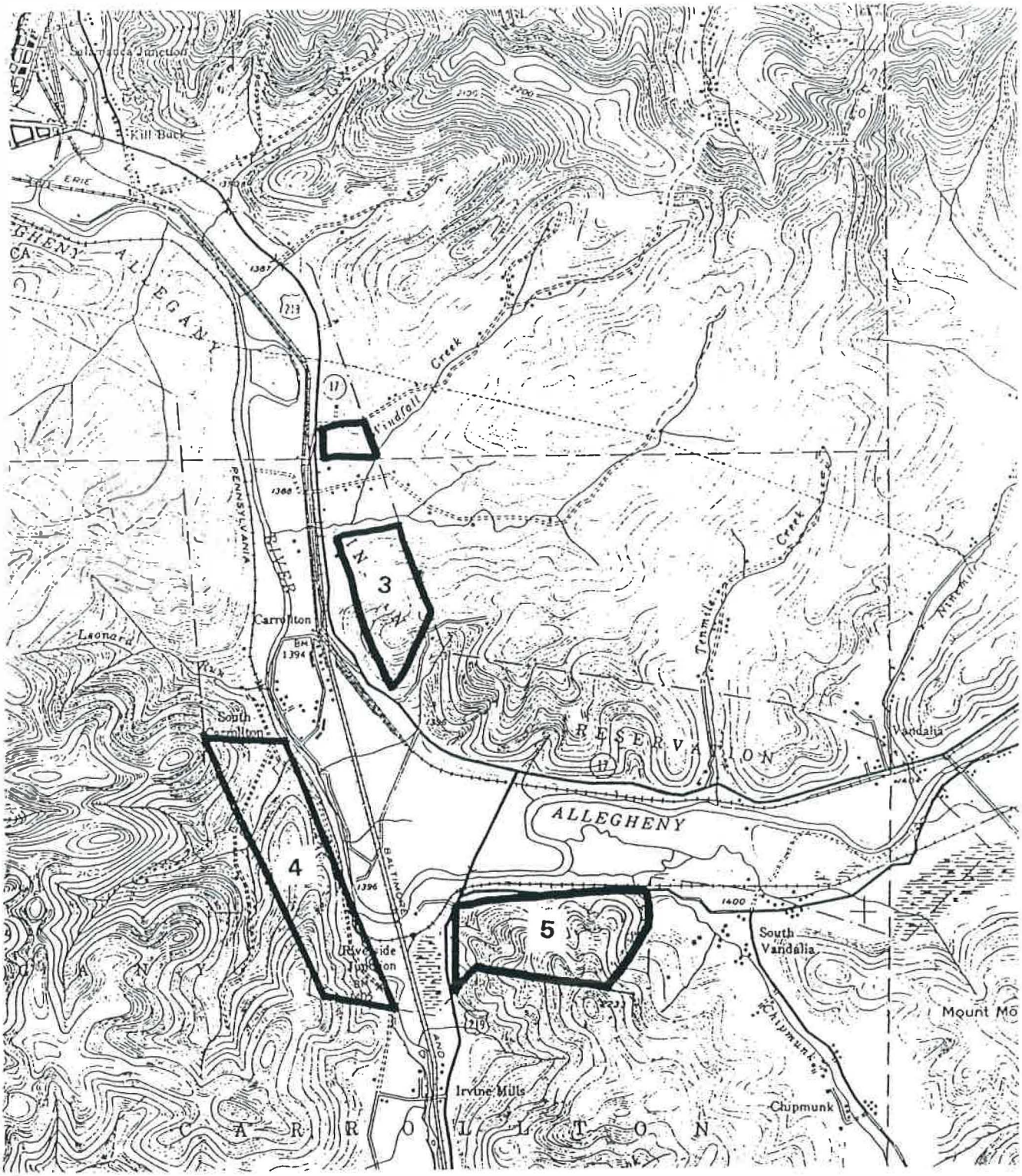
Peter E. Nye
Research Scientist II
Endangered Species Unit Leader



Steamburg, NY, Quadrangle

Red House NY Quadrangle

Biological evaluation areas for forest tent caterpillar and fall cankerworm on the Allegheny Reservation, Seneca Nation of Indians.



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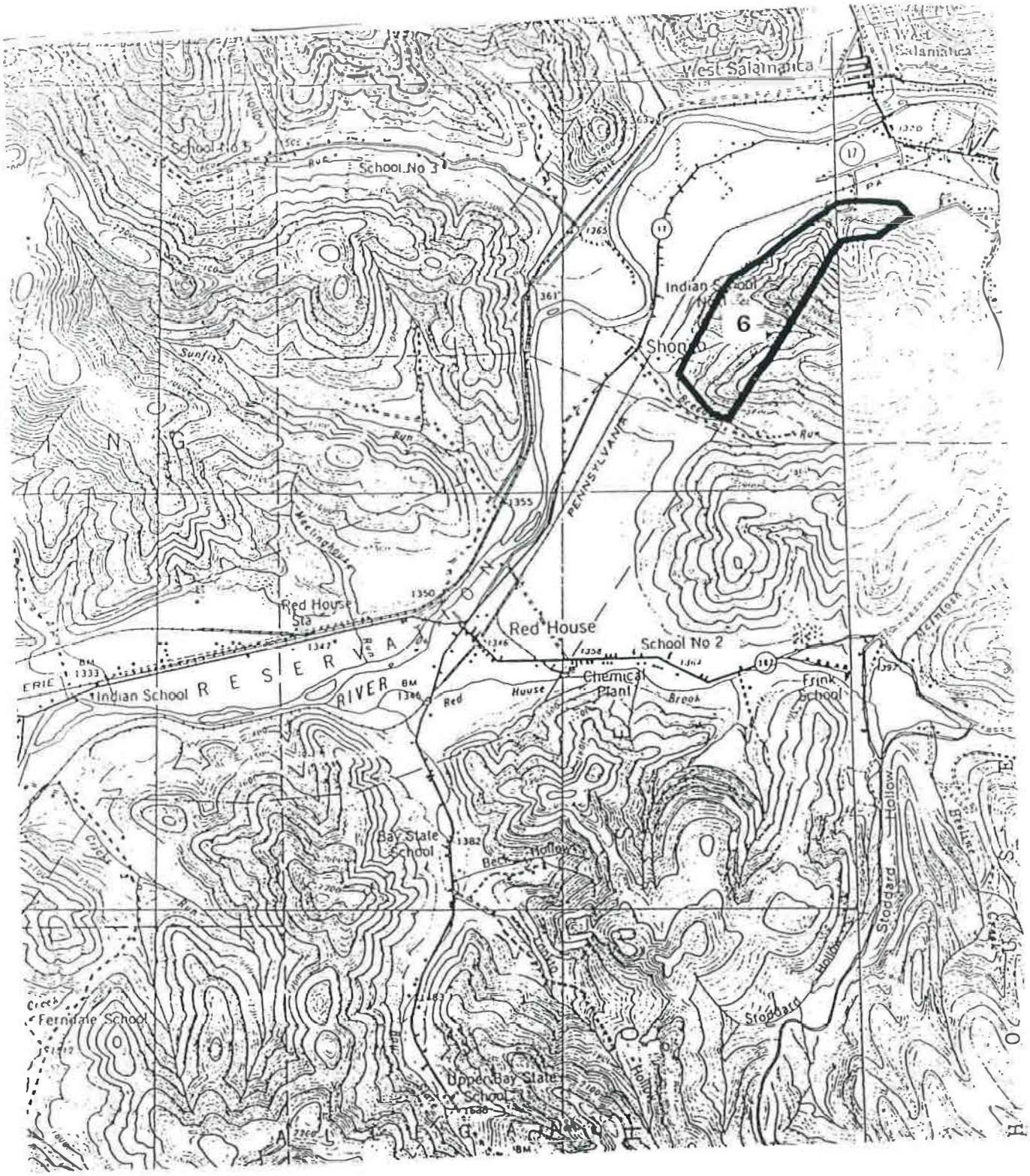

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